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IS 10083 (1982): Method of test for determination of SNF(solids not fat) in milk by the use of lactometers [FAD 19: Dairy Products and Equipment]



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IS : 10083 - 1982

Indian Standard

**METHOD OF TEST FOR DETERMINATION OF
SNF (SOLIDS-NOT-FAT) IN MILK BY THE
USE OF THE LACTOMETER**

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Indian Standard

METHOD OF TEST FOR DETERMINATION OF SNF (SOLIDS-NOT-FAT) IN MILK BY THE USE OF THE LACTOMETER

Dairy Products Sectional Committee, AFDC 34

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AMENDMENT NO. 1 FEBRUARY 1992
TO
IS 10083 : 1982 METHOD OF TEST FOR
DETERMINATION OF SNF (SOLIDS-NOT-FAT) IN
MILK BY THE USE OF THE LACTOMETER

(*Page 3, clause 0.3*) — Insert the following new clause after 0.3:

'0.3.1 It may be noted that the lactometer estimation of solids-not-fat in milk is for routine purposes and is only an estimate nearer to the gravimetric method. All the correction factors suggested in the formula are based on a long time study at different laboratories and fall within the range of error associated with the method. This may not be considered as a very precise method for the estimation of solids-not-fat in milk. For precise estimation gravimetric method may be adopted or the results may be compared with the gravimetric method.'

(*Page 5, clause 4.3.2*) — Substitute the following for the existing formula:

$$\text{'SNF} \approx \frac{\text{CLR}}{4} + 0.25\text{F} + 0.44\text{'}$$

(FAD 18)

Indian Standard

METHOD OF TEST FOR DETERMINATION OF SNF (SOLIDS-NOT-FAT) IN MILK BY THE USE OF THE LACTOMETER

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 29 January 1982, after the draft finalized by the Dairy Products Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Specification for density hydrometers for use in milk (IS : 1183) was first published in 1957 and subsequently revised in 1965 incorporating the improved techniques in the method of calibration. Keeping in view the non-availability of properly calibrated hydrometers and the preference of users to use specific gravity lactometers only, as revealed through data collected from various dairies in the country, the Committee decided that two separate standards be prepared — one covering 'Lactometer' only and other covering the 'Method for determination of solids-not-fat in milk by the use of lactometer'. IS : 9585-1980 Specification for lactometer has already been published. IS : 1183-1965 would be withdrawn after the publication of this standard.

0.3 This standard covers the method of test for determination of solids-not-fat in milk by the use of lactometer. The method and the formula described in this standard is mainly applicable to milk only. The method and formula may not be applicable in the determination of solids-not-fat in fermented milks, condensed milk, etc, as it may not give accurate results. It has been observed that any single formula may not give the results as per the gravimetric method for different categories of milk, but in order to avoid confusion and as was desired at different forms, as far as possible only one formula should be recommended which provides, by and large, the results nearest to the gravimetric method.

0.4 In the formulation of this standard, assistance has been derived from the valuable information received from the National Dairy Research Institute, Karnal.

0.5 In reporting the result of a test or analysis made in accordance with this standard, if the final value observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

*Rules for rounding off numerical values (revised)

IS : 10083 - 1982

1. SCOPE

1.1 This standard prescribes the method for the determination of solids-not-fat in milk using the lactometer.

2. APPARATUS

2.1 The following apparatus is required for conducting the test:

- a) Lactometer with lactometer jar conforming to IS : 9585-1980*
- b) Thermometer — conforming to IS : 9585-1980*.
- c) Butyrometer and stoppers — conforming to IS : 1223-1982†.
- d) Pipette 10-ml or automatic measures or tilt-measures for sulphuric acid — conforming to IS : 1223-1982†
- e) Pipette for milk 10·75 ml — conforming to IS : 1223-1982†.
- f) Pipette 1-ml or automatic measures or tilt-measures — conforming to IS : 1223-1982†.
- g) Centrifuge and water baths — conforming to IS : 1223-1982†.

3. REAGENTS

3.1 Sulphuric Acid — Conforming to IS : 1224 (Part I)-1977‡.

3.2 Amyl Alcohol — Conforming to Grade 1 of IS : 360-1964§

4. PROCEDURE

4.1 Determination of Specific Gravity

4.1.1 General — Milk drawn from the udder contains a large volume of air bubbles and the milk fat undergoes a gradual solidification. Due to these factors a gradual contraction in the volume of milk takes place with a slow increase in specific gravity to a maximum (Racknagal Phenomenon). The specific gravity of milk will, therefore, vary with the duration and temperature of storage. This variation may be overcome by ensuring that the fat is completely in the liquid state before the specific gravity reading is taken. This is achieved by pre-warming the milk.

*Specification for lactometer

†Specification for apparatus for determination of milk fat by Gerber method (*second revision*)

‡Determination of fat by the Gerber method Part I Milk (*first revision*)

§Specification for amyl alcohol (*revised*)

4.1.2 Determination — Warm the sample of milk to a temperature of 40 to 45°C and maintain the sample within this range for five minutes during which time the contents of the bottle are adequately mixed. Care shall be taken to avoid the formation of air bubbles or froth when mixing the sample. The sample is then water cooled to $27 \pm 2^\circ\text{C}$ and held within this range until the specific gravity reading is taken. The sample shall not be held for more than one hour. The reading is then taken according to the following procedure.

4.1.2.1 The sample bottle is gently inverted two or three times. The milk is then poured down the side of the lactometer jar so as to avoid the formation of air bubbles. Sufficient milk shall be poured into the jar to ensure that some of it overflows when the lactometer is inserted. The lactometer, held by the stem, is inserted in the sample and released when it is approximately in its position of equilibrium thus avoiding wetting more than a very short length of the stem above the milk surface. As soon as the lactometer is at rest, the scale reading corresponding to the top of the meniscus of the milk is noted. The lactometer jar shall be vertical and the bulb of the lactometer shall not touch the side. It is advisable to repeat the reading after depressing the lactometer about 3 mm and allowing it to come to rest. Note the temperature of milk with the help of the thermometer.

4.2 Determination of Fat Content of Milk — Determine the fat content of milk by the Gerber method as described in IS : 1224 (Part I)-1977*

4.3 Determination of Solids Content of Milk

4.3.1 Correct the observed lactometer readings (*see 4.1*) at 27°C as per the fat percent ranges with the help of Table 1.

4.3.2 The percent of solids-not-fat in milk is then calculated using the following formula:

$$\text{SNF} = \frac{\text{CLR}}{4} + 0.25\text{F} + 0.6$$

where

SNF = Solids-not-fat in milk,

CLR = Corrected lactometer reading at 27°C , and

F = Percent of fat content of milk

*Determination of fat by the Gerber method: Part I Milk (first revision).

TABLE 1 CORRECTION TO BE APPLIED TO LACTOMETER READINGS TAKEN AT TEMPERATURES OTHER THAN 27°C TO OBTAIN LACTOMETER READING OF MILK AT 27°C

(Clause 4.3)

TEMPERATURE	FAT PERCENT OF SAMPLE				
	0	2	4	6	8
(1)	(2)	(3)	(4)	(5)	(6)
19.0	-2.2	-2.4	-2.6	-2.7	-2.9
19.5	-2.1	-2.3	-2.4	-2.6	-2.7
20.0	-2.0	-2.1	-2.2	-2.4	-2.5
20.5	-1.8	-2.0	-2.1	-2.2	-2.3
21.0	-1.7	-1.8	-1.9	-2.0	-2.2
21.5	-1.5	-1.7	-1.7	-1.9	-2.0
22.0	-1.4	-1.5	-1.6	-1.7	-1.8
22.5	-1.3	-1.4	-1.4	-1.5	-1.6
23.0	-1.1	-1.2	-1.3	-1.4	-1.4
23.5	-1.0	-1.1	-1.1	-1.2	-1.3
24.0	-0.8	-0.9	-1.0	-1.0	-1.1
24.5	-0.7	-0.8	-0.8	-0.9	-0.9
25.0	-0.6	-0.6	-0.6	-0.7	-0.7
25.5	-0.4	-0.5	-0.5	-0.5	-0.5
26.0	-0.3	-0.3	-0.3	-0.3	-0.4
26.5	-0.1	-0.2	-0.2	-0.2	-0.2
27.0	0	0	0	0	0
27.5	+0.1	+0.2	+0.2	+0.2	+0.2
28.0	+0.3	+0.3	+0.3	+0.3	+0.4
28.5	+0.4	+0.5	+0.5	+0.5	+0.5
29.0	+0.6	+0.6	+0.6	+0.7	+0.7
29.5	+0.7	+0.8	+0.8	+0.9	+0.9

(Continued)

TABLE 1 CORRECTION TO BE APPLIED TO LACTOMETER READINGS TAKEN AT TEMPERATURES OTHER THAN 27°C TO OBTAIN LACTOMETER READING OF MILK AT 27°C — *Contd*

TEMPERATURE	FAT PERCENT OF SAMPLE				
	0	2	4	6	8
(1)	(2)	(3)	(4)	(5)	(6)
30·0	+0·8	+0·9	+1·0	+1·0	+1·1
30·5	+1·0	+1·1	+1·1	+1·2	+1·3
31·0	+1·1	+1·2	+1·3	+1·4	+1·4
31·5	+1·3	+1·4	+1·4	+1·5	+1·6
32·0	+1·4	+1·5	+1·6	+1·7	+1·8
32·5	+1·5	+1·7	+1·7	+1·9	+2·0
33·0	+1·7	+1·8	+1·9	+2·0	+2·2
33·5	+1·8	+2·0	+2·1	+2·2	+2·3
34·0	+2·0	+2·1	+2·2	+2·4	+2·5
34·5	+2·1	+2·3	+2·4	+2·6	+2·7
35·0	+2·2	+2·4	+2·6	+2·7	+2·9

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Methods of Test and Laboratory Apparatus Subcommittee, AFDC 34 : 2

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INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	Unit	Symbol	Definition
Force	newton	N	1 N = 1 kg.m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²

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